Dynamic Equilibria

The key areas of study in this topic are:

- Chemical equilibria
- Production and uses of ammonia

By the end of this topic I should be able to:	Start	End
4.13 Recall that chemical reactions are reversible, the use of the symbol ⇌ in equations and that the direction of some reversible reactions can be altered by changing the reaction conditions		
4.14 Explain what is meant by dynamic equilibrium		
4.15 Describe the formation of ammonia as a reversible reaction between nitrogen (extracted from the air) and hydrogen (obtained from natural gas) and that it can reach a dynamic equilibrium		
4.16 Recall the conditions for the Haber process as: 450 °C, 200 atm, iron catalyst		
4.17 Predict how the position of a dynamic equilibrium is affected by changes in temperature, pressure and concentration		
5.19C Describe the Haber process as a reversible reaction between nitrogen and hydrogen to form ammonia		
5.20C Predict how the rate of attainment of equilibrium is affected by changes in temperature, pressure, concentration and the use of a catalyst		
5.21C Explain how, in industrial reactions, including the Haber process, conditions used are related to: • the availability and cost of raw materials and energy supplies • the control of temperature, pressure and catalyst used produce an acceptable yield in an acceptable time		
5.22C Recall that fertilisers may contain nitrogen, phosphorus and potassium compounds to promote plant growth		
5.23C Describe how ammonia reacts with nitric acid to produce a salt that is used as a fertiliser		
5.24C Describe and compare: • the laboratory preparation of ammonium sulfate from ammonia solution and dilute sulfuric acid on a small scale • the industrial production of ammonium sulfate, used as a fertiliser, in which several stages are required to produce ammonia and sulfuric acid from their raw materials and the production is carried out on a much larger scale (details of the industrial production of sulfuric acid are not required)		
5.15C Explain why a particular reaction pathway is chosen to produce a specified product, given appropriate data such as atom economy, yield, rate, equilibrium position and usefulness of by-products		